

PALMAE MALESICAE—XV

The Genus *Ceratolobus* in Malaya

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CERATOLOBUS is a peculiar genus among the Indo-Malayan palms which have scaly fruits (Lepidocaryeae) and rotan-like stems. As in *Calamus* and *Daemonorops*, the spikes are not cylindrical, and the stems do not stop their vegetative growth to produce flowers and fruits and then die, but continue to produce the reproductive parts without ceasing their vegetative growth; that is, the stem is always polycarpic in this genus. But the character that distinguishes a *Ceratolobus* species readily from other rotans generically is the peculiar structure of the spadices; for apart from its being very short and porrect, each panicle of spadix is enclosed in only one external, flattened, lanceolate-fusiform, usually unarmed spathe.

Though the external spathe has a small slit along the margins of the beak, it never fully exposes the panicle, so that the female flowers get fertilized and the fruits mature when they are yet enclosed within the spathe, the external pollinating agents (if any) being allowed access to the flowers through the slits of the external spathe. All the other spathes in the spadix are very short, tubular and closely sheathing.

The male and the female (the latter polygamous?) spadices are produced on different plants; however, at each spathe the female flower is always accompanied by a neuter (or male?) flower, while the flowers on the male spadix are solitary at each spathe. In all flowers the calyx is very small, and the corolla very much longer than the calyx. The fruit is one-seeded, having a ruminant albumen and basilar embryo. The stems are apparently always tufted, and the leaves are cirriferous; the leaf-sheaths are never flagelliferous and the ocrea consists of a thin, membranous, deciduous rim at the mouth of the leaf-sheath.

The leaflets are either rhomboidal in the section *Eu-Ceratolobus* or linear-lanceolate in the section *Cryptocladus*. Sterile plants of the *Eu-Ceratolobus* can be easily distinguished from *Korthalsias* having rhomboidal leaflets by the

absence of a prominent ocrea on the leaf-sheath, and the ansae (little stalks) at the base of the leaflets, and from *Calamus* spp., which have rhomboidal leaflets, by the absence of flagellae (whips) on the leaf-sheaths and the by the presence of a long cirrus at the end of each leaf.

Ceratolobus appears to represent a transitional stage in the evolutionary history of *Daemonorops* and *Calamus*. The species of the section *Eu-Ceratolobus* are distributed as follows: *C. glaucescens* in Java, *C. concolor* in Sumatra, *C. discolor* and *C. rostratus* in Borneo, and *C. Kingianus* in Malaya. The section *Cryptocladus* consists of only one species, *C. laevigatus*, which is very polymorphous and which occurs in Malaya, Borneo and Sumatra, but not in Java. A study of the variations in this species has obliged me to reduce the varieties *major* and *sub-angulatus* respectively to varieties *angustifolius* and *regularis* of the same species.

I. *Eu-Ceratolobus*.

Ceratolobus Kingianus Becc. in Hook. f., Fl. Brit. Ind. VI (1893) 477; Ridl., Mat. Fl. Malayan Pen. II (1907) 187; Becc. in Ann. Roy. Bot. Gard. Calc. XII, 2 (1918) 9 et (1921) tt. 5 and 6; Ridl., Fl. Mal. Pen. V (1925) 46. (Fig. 19).

Stem 6-8 m. long, with sheaths 2-3 cm. in diam., *Leaf-sheaths* gibbous above; when young covered with deciduous, minute, erect hairs and mealy furfur, later scabrid with imbricate horizontal ridges minutely punctate with black vestiges of fallen hairs; obliquely truncate; ocrea reduced to a brittle membranous rim, ligulate in the axils and callused at the base on the petiole. *Leaves* about 1 m. long including the 40-50 cm. long cirrus; petiole 12-20 cm. long, up to 10 mm. broad, slightly flattened with rounded margins, shortly prickled all round, or scabrid as in the sheath on the basal part of the dorsum; rachis subterate, armed all round in the lower part with short claws, but higher up only dorsally with ternate claws. *Leaflets* about 3-5 on each side of rachis, cuneately rhomboidal, paler or glaucescent beneath, with non-ansate bases, upper margins irregularly or sub-duplicate lobulate, and erosely toothed, the largest at the base of rachis, 20-30 cm. long, 10-13 cm. broad, the upper one gradually smaller. *Inflorescences* dioecious, sessile, male and female externally similar; the enclosing spathe persistent, strongly flattened, two-edged, unarmed, except with a few teeth along the margins at base, elliptic-fusiform, cinnamon brown in colour, 20-28 cm. long, 4-7 cm. broad. *Female panicle* twice branched, enclosed within one external (primary) spathe even after the anthesis; the lowermost internal (secondary) spathe the next largest, lanceolate-acuminate; other secondary and tertiary spathes tubular, closely sheathing, obliquely truncate at the mouth, subulate at apex; the primary branches short, alternately and fastigiately borne on the main axis, each branch bearing a few flowering branchlets; spathels (quaternary

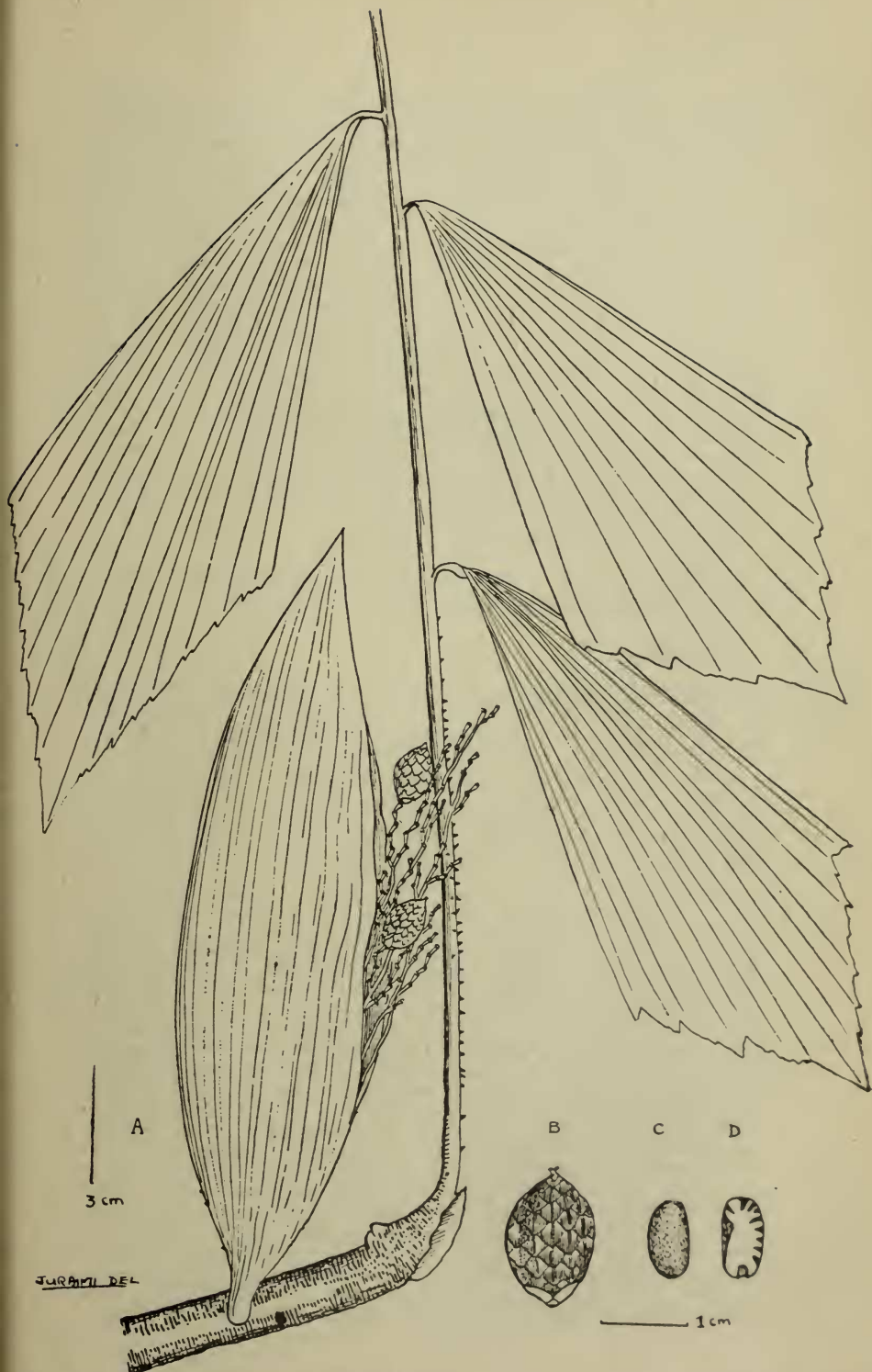


Fig. 19. *Ceratolobus Kingianus* (Wray 2,869).

A, Caudicis fragmentum, spadice et parte frondis basali instructum. B, Fructus maturus. C, Semen verticaliter discissum.

spathes) short, funnel-shaped, ligulate on one side; involucre shallow cupular, latter 3-toothed; areola of neuter flower punctiform. *Female flowers* 2-3 on each branchlet, all seated more or less on one side; each flower subglobose, 3 mm. in diam.; calyx membranous, very short, cupular, 3-toothed; corolla much longer than the calyx, 3-partite; staminodes united at their bases with the corolla, having triangular filaments and sagittate sterile anthers; ovary globose. *Neuter flowers* very much like the male but slightly larger, 6 mm. long, having sterile, sagittate anthers (fide Beccari). *Fruit* globose, 15 mm. in diam., shortly beaked, having its perianth explanate; scales in 12 longitudinal series, uniform dark brown; seed globular, 1 cm. in diam.; chalazal cavity deep, lateral; albumen slightly ruminate; embryo basal. *Male panicle* thrice divided; the tertiary branches short, bearing alternately 3-6 flowers; spathes and spathelets as in female spadix; involucre shallow, cupular, 3-toothed. *Male flowers* oblong, trigonous, 5 mm. long; calyx short, cupular, 3-toothed; corolla many times as long as the calyx, coriaceous, deeply 3-partite; stamens with subulate filaments inserted near the base of petals, inflexed at apex; anthers linear; ovary rudimentary, small, papilliform.

MALAYA: Perak, Larut Hills (Wray 2,869).

I have not seen the other syntypes of this species except from their photographic plates given by Beccari.

II. *Cryptocladus*.

Ceratolobus laevigatus (Mart.) Becc. in Hook. f., Fl. Brit. Ind. VI (1893) 477; Ridl., Mat. Fl. Mal. Pen. II (1907) 187; Becc. in Ann. Roy. Bot. Gard. Calc. XII, 2 (1918) 13 tt. 9-11; Ridl., Fl. Mal. Pen. V (1925) 46.

C. subangulatus Becc. in Ann. cit. XI Suppl. (1918) iii.

Calamus laevigatus Mart., Hist. Nat. Palm. III (1850) 339; Miq., Fl. Ind. Bat. III (1855) 129.

C. subangulatus Miq., Prodr. Fl. Sum. (1860) 256.

Stems tufted, 3-4 m. long, slender, with sheaths 8-15 mm. in diam. *Leaf-sheaths* strongly gibbous above, obscurely ridged longitudinally, armed with scattered, flattened, triangular, deflexed, 5-10 mm. long spines, at the mouth obliquely truncate and bordered by a perishable, brittle membranous ligulate ocrea. *Leaves* 60-75 cm. long including the cirrus, 35-45 cm. long in the pinniferous part, sometimes much shorter; petiole very small, almost absent; rachis armed along the dorsum with 1-3-nate claws. *Leaflets* 10-12 on each side of the rachis, rarely a few more, frequently in opposite groups of 2-3 on each side, or equidistant or inequidistant; those at apex ascendent, those towards the base reflexed, and those in groups divergent; all papyraceous, lanceolate, or oblanceolate, at times tapering below to an acute base; acuminate, suddenly or gradually narrowed into a long filiform bristly tip; the midnerve smooth or setulose above, or at times below also, remotely setulose in the margins, otherwise smooth, 10-18 cm. long, 15-25 mm. broad, sometimes much longer and narrower, especially those that are strongly grouped. *Spadices* male and female externally alike, each enclosed in a flattened, edged external (primary) spathe, shortly pedicelled, 12-15 cm.

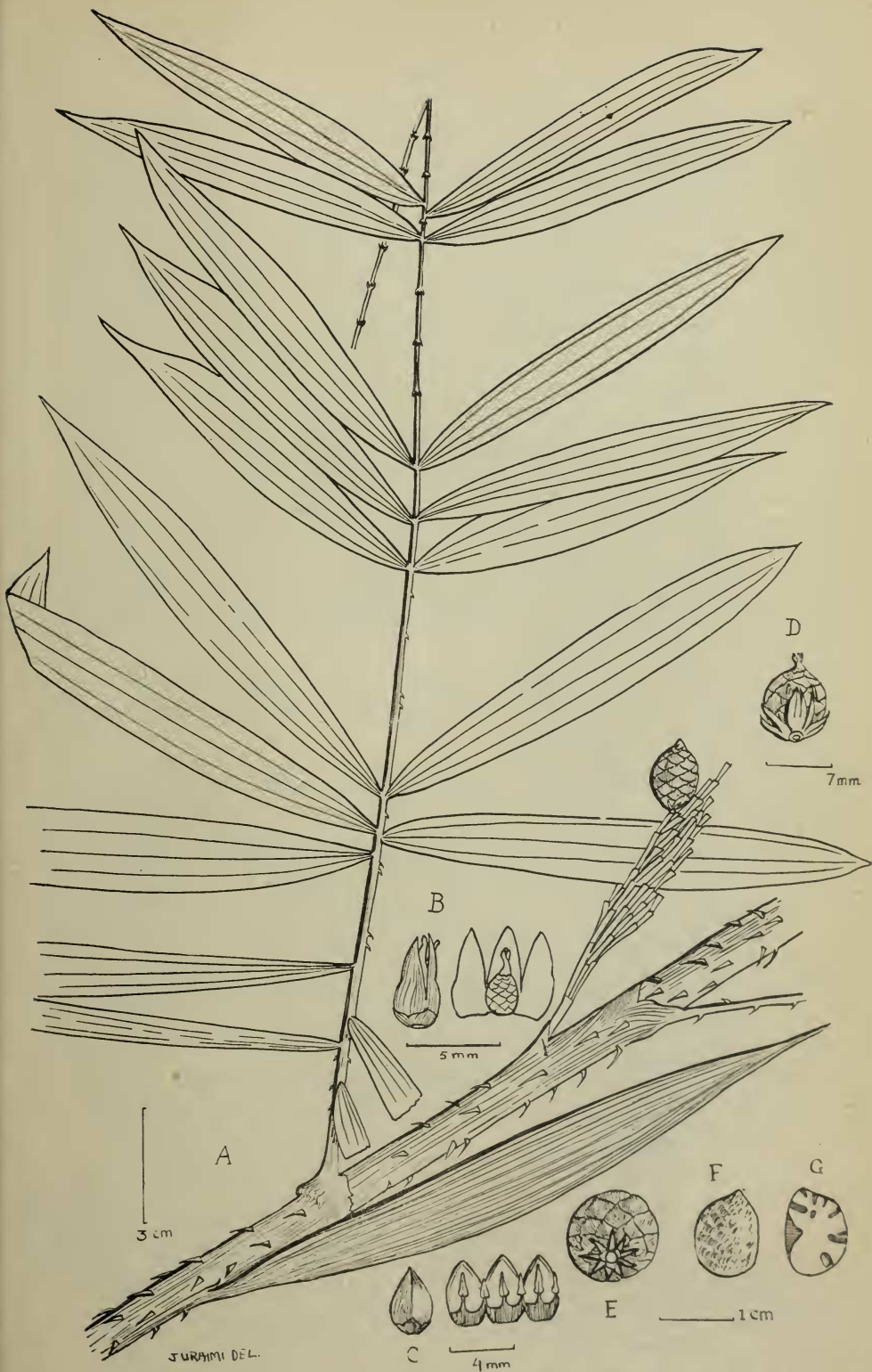


Fig. 20. *Ceratolobus laevigatus* var. *laevigatus* (A and E-G: Ridley 12,120; B-D: Ridley sn. ex Tapah).

A, Caudicis fragmentum cum fronde et spadicibus. B, Flos ♀ integer, et ibid. cum tepalis aperti ut pistillum appareat. D, Fructus juvenilis cum perianthio. F, Semen integrum. C, Seminis sectio verticalis.

long, 12-30 mm. broad, acute in edges, lanceolate-elliptical or fusiform in outline, at base narrowed, acute, often aculeate along the margins, at apex prolonged into a long beak, otherwise glabrous, cinnamon brown-colour, papyraceous. *Female panicle* twice branched, covered with tobacco-brown puberulous-scurf; the branches (secondary) bearing 3-5 female flowers, each accompanied by a neuter flower; secondary and tertiary spathes tubular, obliquely truncate at the mouth with ligulate apex on one side; spathels funnel-shaped, obliquely truncate, ligulate on one side; involucre cyathiform, often conspicuously pedicellate; involucre slightly exsert, cupular, more or less 3-toothed; areola punctiform. *Female flowers* ovoid, 6 mm. long, ventricose at base; calyx membranous, cupular, 3-toothed; corolla coriaceous, 3-partite; staminodes adnate to the corolla base, triangular in filaments and linear-sagittate in sterile anthers; ovary globular. *Neuter flowers* similar to male flowers. *Fruit* elliptic-ovoid, conically beaked, 16-25 mm. long, 12-18 mm. broad, with a pedicelliform perianth; scales in 12 longitudinal series, dark to reddish brown in colour, concolorous or with dark marginal line; seed globular-ovoid, with ruminant albumen, basal embryo, and deep chalazal cavity. *Male panicle* thrice branched; tertiary branches short, each carrying 2-3 flowers only; spathes as in the female panicle; spathels short, funnel-shaped, ligulate on one side; involucre small, very shallow cupular, 3-toothed. *Male flower* 4 mm. long; calyx short, membranous, 3-lobed; corolla much longer than the calyx, deeply 3-partite; anthers linear, fixed in the middle to the filaments.

A very polymorphic species, found wild in Malaya, Sumatra and Borneo. The following varieties have been noticed in Malaya:

- (a) *C. laevigatus* var. *laevigatus* (cf. Becc. op. cit. tt. 9 and 10). (Fig. 20).

Leaves with short pinniferous parts, and lanceolate leaflets; the latter relatively broad and short, contracted suddenly at apex, arranged in more or less distant groups. *Fruit* having its corolla lobes split more or less irregularly even in young stages of the fruit; fruit scales dark dull claret brown, concolorous with slightly light coloured erose margins.

MALAYA: Perak, Bujong Malacca (Curtis 3,163; Ridley 9,812); Kamuning (Machado); Tapah (Ridley in XI-1908). *Selangor*, Sungai Buluh (Ridley 13,448); Semangkok (Ridley 12,120); Damansara Hill in Kuala Lumpur (Ridley XII-1920).

- (b) *C. laevigatus* var. *angustifolius* Becc. in Hook. f., Fl. Brit. Ind. VI (1893) 477 et in Ann. cit. (1918) 16. (Fig. 21).

C. laevigatus var. *major* Becc. in Ann. cit. (1918) 16 *syn. nov.*

Leaf-sheaths less armed than in the type. *Leaflets* very narrow, acuminate, arranged distinctly in groups, divergent in each group. *Fruit* ovoid elliptic, beaked, with corolla lobes hardly split, usually entire; the scales dull cinnamon brown with darker intramarginal line, and light erose margin.

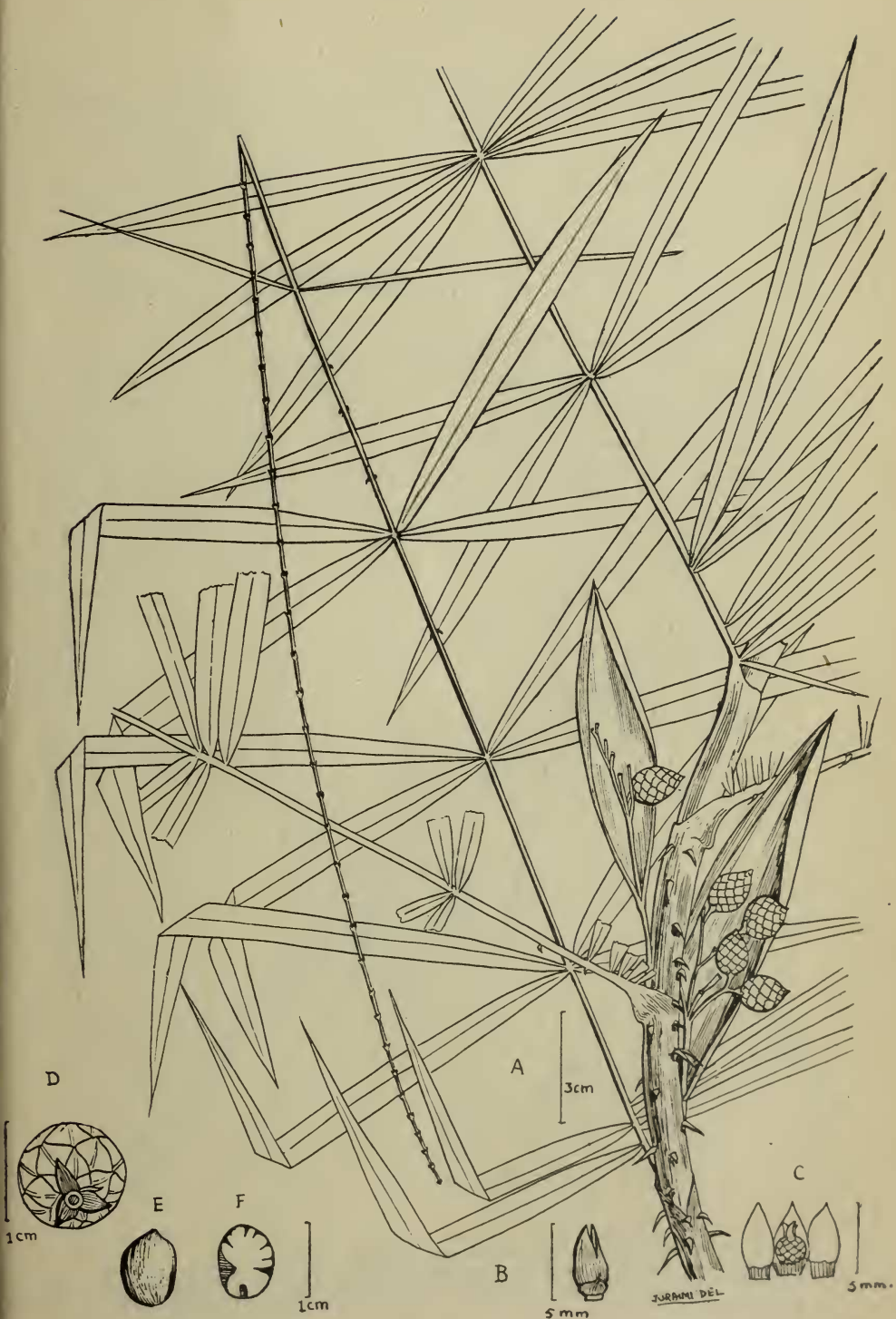


Fig. 21. *Ceratolobus laevigatus* var. *angustifolius* (Ridley 3,488).

A, Fragmentum caudicis cum spadicebus fructigeris et frondibus B, Flos ♀. C, Flos ♀ apertus ut pistillum appareat. D, Fructus maturus cum perianthio. E, Semen integrum. F, Semen verticaliter discissum.

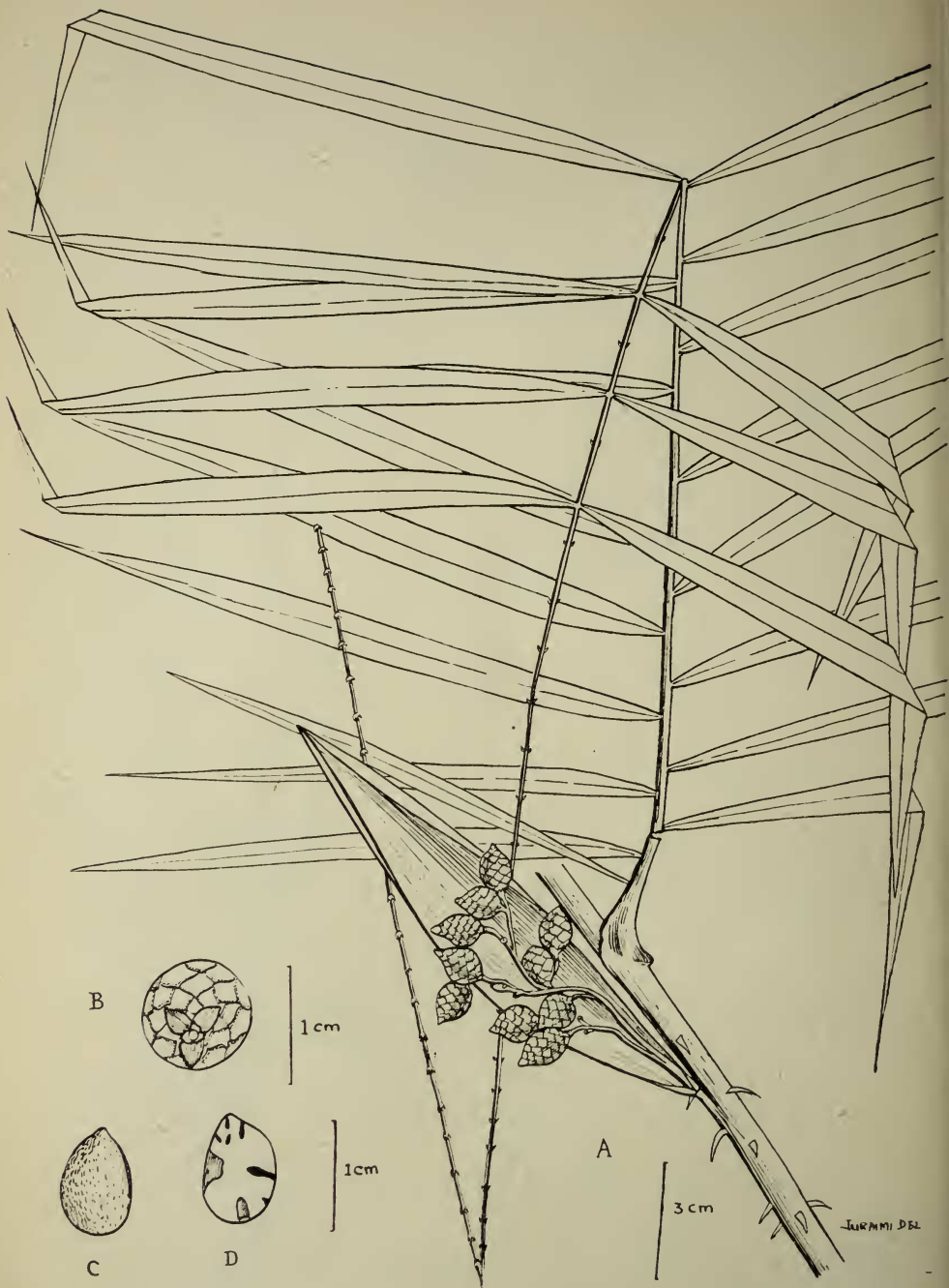


Fig. 22. *Ceratolobus laevigatus* var. *regularis* (Ridley 7,904).

A, Fragmentum caudicis, spadice fructiferenti et fronde instructum. B, Fructus maturus cum perianthio. C, Semen integrum. D, Semen in longitudinem median discissum.

MALAYA: *Perak*, Taiping Hills (Ridley 11,463; Henderson 11,597; Haniff and Nur 2,377; Burkill and Haniff 13,128); Maxwell Hill (Ridley in 1892, and 3488; Burkill and Haniff 12,696).

(c) *C. laevigatus* var. *regularis* Becc. in Ann. cit. XII 1918) 16. (Fig. 22).

C. laevigatus var. *subangulatus* Becc. op. cit. (1918) 16 t. 11. *Syn. nov.*

Calamus subangulatus Miq. op. cit. p. 256.

Stem less armed than in the type. *Leaflets* elongate and narrower, gradually narrowed towards the apex, almost regularly set, sub-opposite or opposite, divaricate, occasionally interrupted and sometimes approximate towards the apex; the midcosta occasionally bristly in one or both surfaces. *Fruit* with corolla lobes entire or slightly split; the scales of cinnamon brown colour with a dark intra-marginal line.

MALAYA: *Dindings*, loc. incert. (Curtis in XII-1902, as *Rotan Prot Ayam*); Lumut (Ridley 10,340; II-1896; 3489 type of this variety; 7904; Burkill 491); *Perak*, Sungai Siput (Haniff and Nur 6,968); Gunong Keledang (Ridley 9,808).

DISTRIBUTION: Sumatra.